

# POST-MENOPAUSAL OSTEOPOROSIS

## Has it been medicalized?

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**Abstract:** Millions of women will be prescribed hormone replacement therapy (HRT) and be told that it will prevent osteoporosis occurring, despite the fact that there is doubt about its long term usefulness. Preventive measures outlined in this article are much more preferable, but need to be directed towards the whole population, not just menopausal women. The prevention of osteoporosis is an important public health issue which needs to be addressed now, not in the next century. This article explores the issues that surround the medicalisation of post-menopausal osteoporosis.

**Key Indexing Terms:** Osteoporosis, menopause, medicalization, prevention.

### INTRODUCTION

Osteoporosis is a term used to describe a reduction in bone mass per unit volume. It is caused by anything that causes an increase in bone resorption compared with bone formation (1). Histologically, there is a decrease in cortical bone thickness and a decrease in the number and size of the trabeculae of cancellous bone (1). It is the most common metabolic bone disease and causes considerable problems in the elderly (1).

In some patients osteoporosis is caused by diseases such as hypogonadism, hyperthyroidism or partial gastrectomy (2), but in most cases, no other disease is found. One type of osteoporosis occurs mainly in post-menopausal women between 51 and 75 years of age and involves mainly loss of trabecular bone (Type I), and another type involving the loss of both cortical and trabecular bone occurs in men and women older than 70 years of age (Type II). In both these types, fractures can occur, but in Type I the main fractures are vertebral and forearm, and in Type II the main fracture sites are femoral neck, pelvis, tibia and humerus (1).

Osteoporosis is a public health problem in Australia and other countries. In the USA in 1986, osteoporosis was linked to 1.2 million fractures including 227,000 hip fractures. Of those with hip fractures, 12-20% die, 50% of the survivors become nursing home candidates and only 30-35% recover independence after the first year. The cost of these fractures was estimated at over US\$6 billion dollars in 1986 (2).

Females have a greater risk of osteoporotic fracture than males, with the age adjusted figures ranging from 6:1 at the wrist and spine, to 2:1 at the hip (3). Most post-menopausal women lose bone at a rate between 7 - 13% per decade (4). Fracture rates increase exponentially after menopause with over 80% of all fractures occurring over the age of 75 years (5). A 1986 study conducted in New South Wales showed that age-specific hip fracture rates doubled every 5.6 years for females over 50 years of age. The estimated number of hospital admissions will increase by 83% by the year 2011 due to the ageing of the Australian population (6). In England it is estimated that one in four women living to 90 years of age can expect a hip fracture (5).

The natural process of "bone thinning" actually commences long before menopause because a woman achieves her "peak" bone density at about 30 years of age (5,10). Yet the message given to women in this country is that most women will develop osteoporosis and that Hormone Replacement Therapy (HRT) will prevent it, and therefore that all women should take HRT and stop this terrible problem from occurring. Aging itself causes bone "thinning" in both men and women but relatively few will actually have osteoporosis severe enough to cause fractures and pain (7). Women commencing HRT at 50 years of age or so will need to take it for more than 25 years to prevent the fractures that mainly occur over the age of 75 and there is no indication that HRT is useful over the age of 75 years anyway (8).

### BONE DENSITY

The peak bone mass reached by women is influenced by genetics to a large degree, but it can be influenced by the woman's calcium intake as well. Calcium supplements can increase bone mineral density by up to 3 to 4% in growing pre-pubertal children, even if they take nearly 1000mg per day in their food (9). If this gain persisted, an increase in peak bone mass should be seen (9). Calcium needs are greatest during adolescence and even though bone is no longer growing in young adulthood, young adults need more than 950mg of calcium per day to remain in a positive calcium balance. This positive balance is needed to allow expansion of the periosteum and for consolidation of the bone (10).

Normal premenopausal women not taking calcium supplements (up to 1500 mg per day) will lose up to 1% of bone per year (11,12). The addition of calcium supplementation prevents that loss. Women who are postmenopausal and who take calcium supplements of 1000mg per day may reduce their bone loss by up to 50%

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at non-vertebral sites. Further, perimenopausal women who exercise and take calcium supplements lose less bone than those who exercise only (11,12).

### **OTHER FACTORS ASSOCIATED WITH BONE DENSITY**

Weight bearing exercise can increase the bone density of the lumbar spine and smoking can decrease the same bone density by up to 10 percent (13). Smoking can also accelerate the loss of bone that occurs at menopause. If a woman stops smoking before the menopause, she can reduce the risk of a hip fracture by about one quarter on average, with heavy smokers reducing their risk even further (5).

Many drugs, such as corticosteroids and some anticonvulsants can decrease bone density, as can excessive alcohol intake. Excessive exercise inducing amenorrhoea can lead to bone loss in young women athletes and ovulatory dysfunction can cause a lower bone mass to be achieved in adolescents and young adults (11). Simply being thin can reduce bone density (5). Anorexia nervosa causes a rapid change in bone metabolism and rheumatoid arthritis is associated with lower bone mass.

Moderate alcohol intake can be associated with a higher bone density. Women who have breast fed or who have taken oral contraceptives have a higher bone mass at menopause. The advantage given by oral contraceptives may not be long lasting however (14).

### **MENOPAUSE**

In the early years of menopause there is a sudden increase in the amount of bone lost, with most bone being lost in the first 3 to 6 years. Thereafter, bone loss attributed to lack of oestrogen occurs for up to 20 years but interestingly, only one third to one half of all bone lost is due to menopause (11). If oestrogen is commenced at menopause the increased bone resorption is reduced, and this early bone loss is prevented.

Once the oestrogen therapy is discontinued however, this accelerated phase of bone loss occurs as at natural menopause and any protection offered by oestrogen may be lost 5 years after the oestrogens are stopped. Even women aged 75 or more who took oestrogen for more than 10 years had no major difference in bone density measurements of their lumbar spine and femoral neck compared with those women who had never taken oestrogens (8).

### **EXERCISE**

Post menopausal women who exercise three times a week can reverse the normal bone loss and even women over 70

years of age can increase their bone density in this way compared with sedentary women of the same age. The effect of this exercise can reduce the risk of hip fracture by about half in both men and women (5). One hour of walking and range of motion exercises twice a week can increase bone density by up to 3.5% in eight months (15).

Exercise and physical fitness also reduces the risk of falls. Muscle strength is associated with increased effectiveness of protective responses such as extending the arms, quick stumbling movements of the feet and grabbing at nearby objects. These have the effect of absorbing the energy of the fall with the hands or feet and reducing the force of impact on the hip or spine. A decrease in the amount of soft tissue around the hip can cause there to be a decrease in the ability of these tissues to absorb any impact. In the elderly there is a decrease in the muscle bulk and strength which is age- related (16).

A reduction in physical activity over the past thirty years has occurred in Britain, and increased mechanisation has meant that jobs are less physically demanding than before. The effect of occupation on the bone density appears to be permanent, and if the occupation is more sedentary, the bone density is less (5).

In the same way, immobilization leads to a reduction in bone density and muscle mass and an increased risk of hip fracture.

### **VITAMIN D**

There is a seasonal difference in bone density and in hip fractures with bone density being lowest in winter and hip fractures being highest in winter, which suggests that the role of vitamin D may be important. Fortified milk and sunlight could be sources of vitamin D not utilized fully (17). Exposure to 30 minutes of sunlight per day, or an increase in adult vitamin D intake by 4 fold could influence bone density and decrease fracture risk without increasing the risk of skin cancer or toxicity from vitamin D (17).

### **OTHER FACTORS**

Responses to falling may be affected by alcohol and sedative drugs. Hip fractures are increased in patients who take long acting sedatives and who have a regular intake of alcohol. "Drop attacks" and syncope also increase the risk of falls and protective responses cannot be relied upon during these (16). Poor eyesight and coordination also increases the risk of falls (18). Neurological conditions and lower limb disability are associated with abnormal balance and increased numbers of falls (19).

Some patients who sustain vertebral crush fractures have a normal vertebral bone mass, therefore vertebral bone

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elasticity may be an important factor. The strength of vertebral bodies decrease with age as an independent factor (20).

### **TREATMENT OF OSTEOPOROSIS BY HORMONE REPLACEMENT THERAPY**

Postmenopausal lumbo vertebral bone loss can be changed significantly to a bone gain by either continuous or sequential oestrogen and progesterone therapy within one year. The changes in bone density can be seen as early as 6 months after commencement of therapy, and after 12 months there can be as much as 5-6% improvement (20). The benefit of hormone replacement therapy is seen for as long as the woman maintains the treatment at least up to 75 years of age. Unfortunately, once the hormone therapy is stopped, the protection also stops very quickly (5).

Added bonuses suggested for women taking hormone replacement therapy may be a reduction in ischaemic heart disease of up to 45%, higher HDL cholesterol levels and lower LDL levels, as well as lower glucose and insulin levels. These figures have been quoted generally in healthy patients taking oestrogen alone (21), but the combination of oestrogen and progestin may not adversely affect this profile (22). Many trials have been done with women in a higher social class who have less mortality from cardiovascular disease anyway (21).

Bone density screening has been advocated by some people for all menopausal women, and the suggestion is then to put all women with a bone density more than one standard deviation below the mean onto oestrogen (11). Unfortunately the difference in bone density at the neck of the femur between the group of women with hip fracture and the group of women without a fracture is only half a standard deviation. This implies that the difference is too small for bone density testing to be a good screening test for the whole population to predict which patients will develop a hip fracture (5). Any benefit in the prevention of osteoporosis must be weighed against the risk of developing breast cancer which has been shown to be increased in women taking oestrogen alone or oestrogen in combination with progestin. This risk increases with the length of time that the woman is taking hormone replacement therapy, particularly with use for more than five years, and also increases with the woman's age, especially over 55 years of age (23).

### **OTHER TREATMENTS AVAILABLE FOR ESTABLISHED OSTEOPOROSIS**

These include etidronate in a cyclical fashion two weeks on, thirteen weeks off, which has been shown to increase vertebral bone mineral content by about 5% and to decrease the number of new vertebral fractures in

postmenopausal women with osteoporosis (24). There has been a recent interest in using calcitriol (1,25 dihydroxyvitamin D3) which increases calcium absorption and stimulates osteoblasts (25).

### **HEALTH COSTS**

Cost benefit analysis can be calculated by estimating costs of drugs, consultations and tests required, as well as the benefits. If this is done for hormone replacement therapy for women with menopausal symptoms, with oestrogen alone or with both oestrogen and progesterone (but not having any side effects from the progesterone), it shows a benefit if hormone replacement therapy is used for 15 years, reducing the risk of ischaemic heart disease and osteoporotic fractures. But for women who are asymptomatic, prophylactic hormone replacement therapy for prevention of osteoporotic fractures alone is not cost-effective. If cardiac benefit is included in these asymptomatic women, only women on prolonged oestrogen after hysterectomy are using health resources reasonably (26).

### **ALTERNATIVES TO HORMONAL TREATMENT OF MENOPAUSE RELATED OSTEOPOROSIS**

1. Obtain the best peak bone mass possible.
2. Exercise programmes should be encouraged. Regular exercise could reduce hip fractures by up to 50% (5). Exercise programmes for the elderly would require a long term education campaign and a change in personal and community attitudes towards exercise by elderly people.
3. Calcium intake should be adequate throughout life. There may be a role for vitamin D fortified milk as a source for this calcium (17).
4. Everyone should be encouraged to stop smoking. Women who stop smoking before menopause can reduce their risk of fracture by about 25% (5).
5. Exercise should be outside if possible (17).
6. Avoidance of excess alcohol and sedatives should be undertaken (16).
7. Prevention of falls at home should be a priority. Many falls occur at home and reducing the likelihood of falling on a hard surface can be done by carpeting the areas. Grab bars could be installed and extra stair rails would be helpful (19). A simple night light may help.

### **CONCLUSION**

Post-menopausal osteoporosis has been medicalized. Millions of women will be prescribed hormone replacement therapy (HRT) and be told that it will prevent osteoporosis occurring, despite the fact that there is doubt about its long term usefulness. Preventive measures as outlined above are much more preferable,

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but need to be directed towards the whole population not just menopausal women. The prevention of osteoporosis is an important public health issue which needs to be addressed now, not in the next century.

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